W. NEWLOVE.

Grinding Mill.

No. 8,425 Patented Oct. 14, 1851.

Fig. 1.

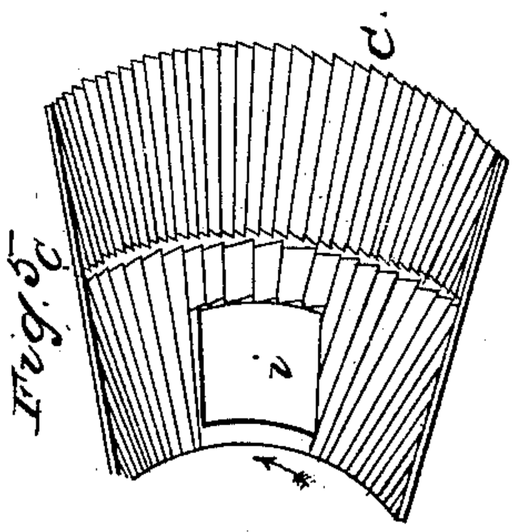


Fig. 2.

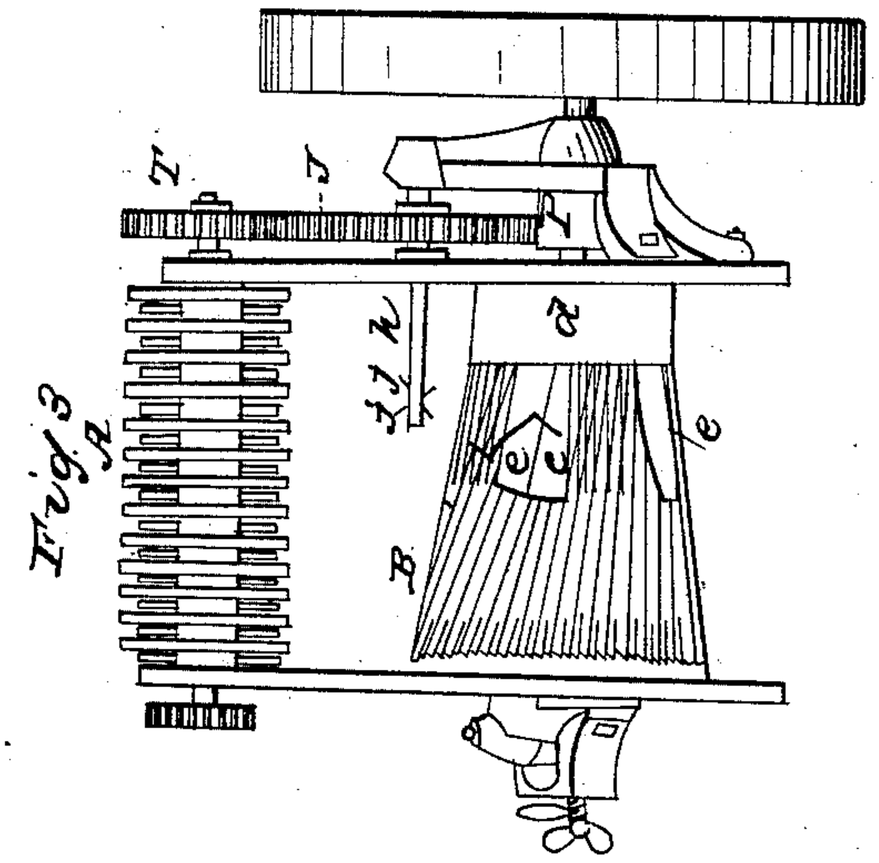


Fig. 3.

Fig. 4.

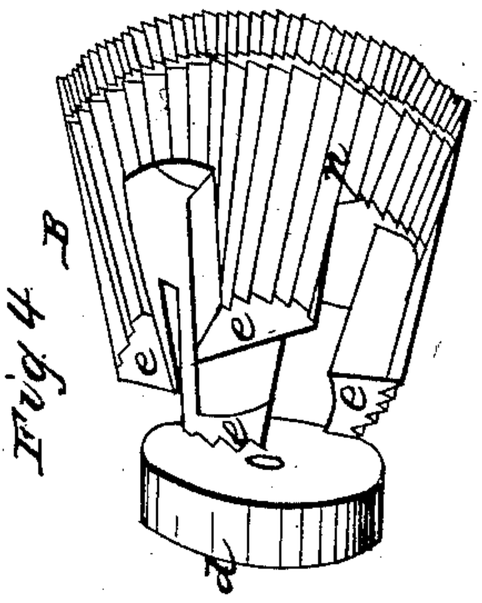


Fig. 5.

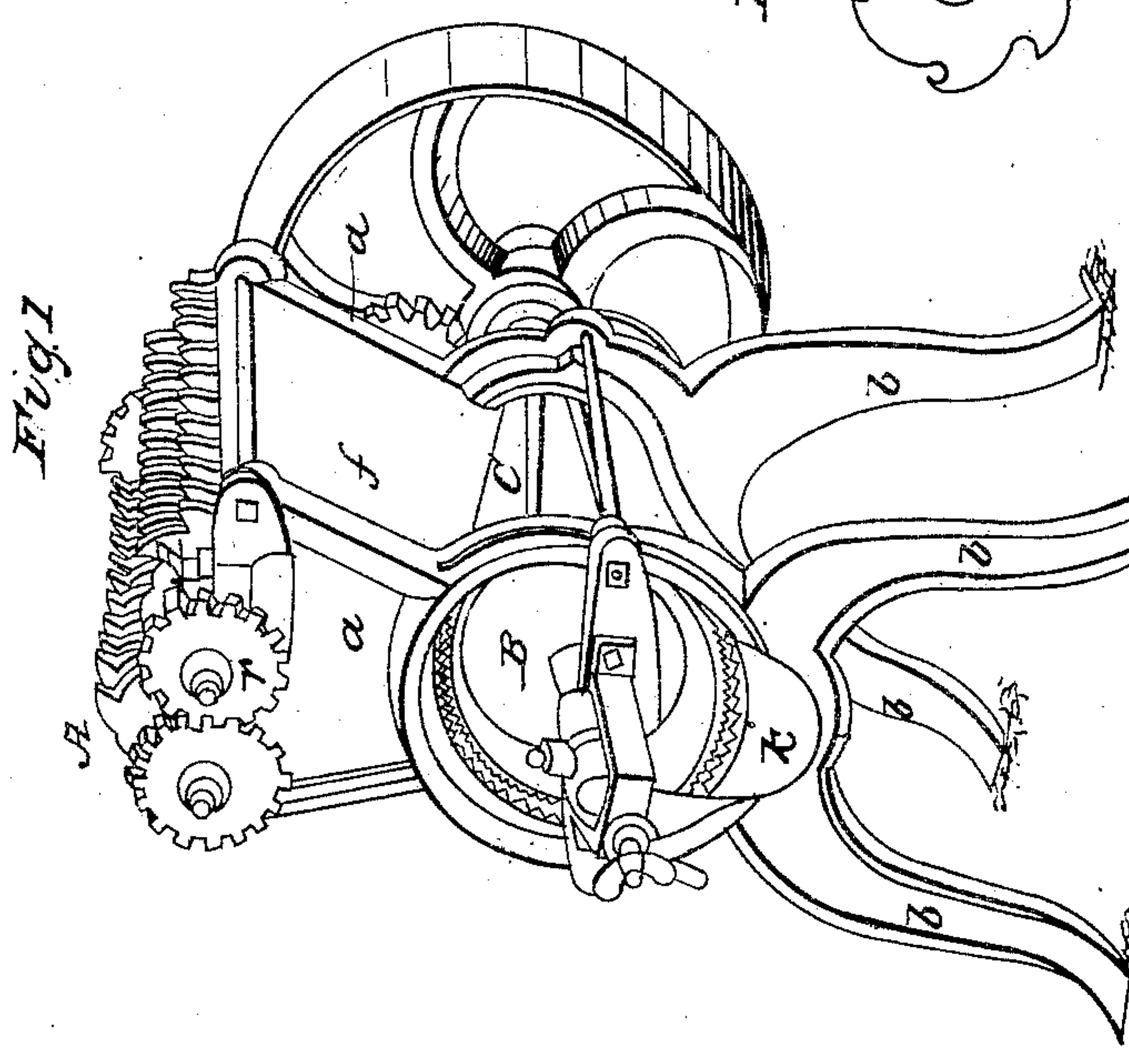


Fig. 6.

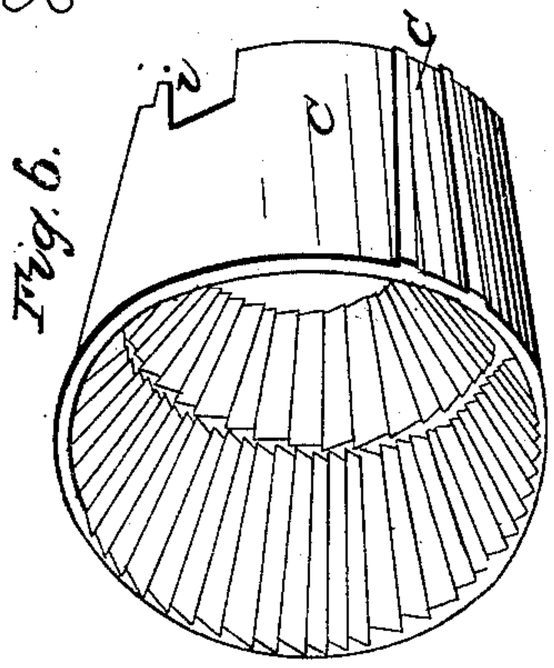


Fig. 7.

Fig. 8.

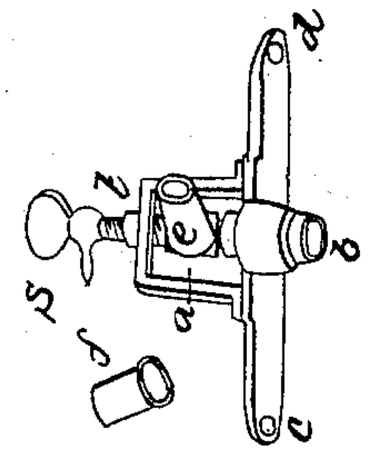
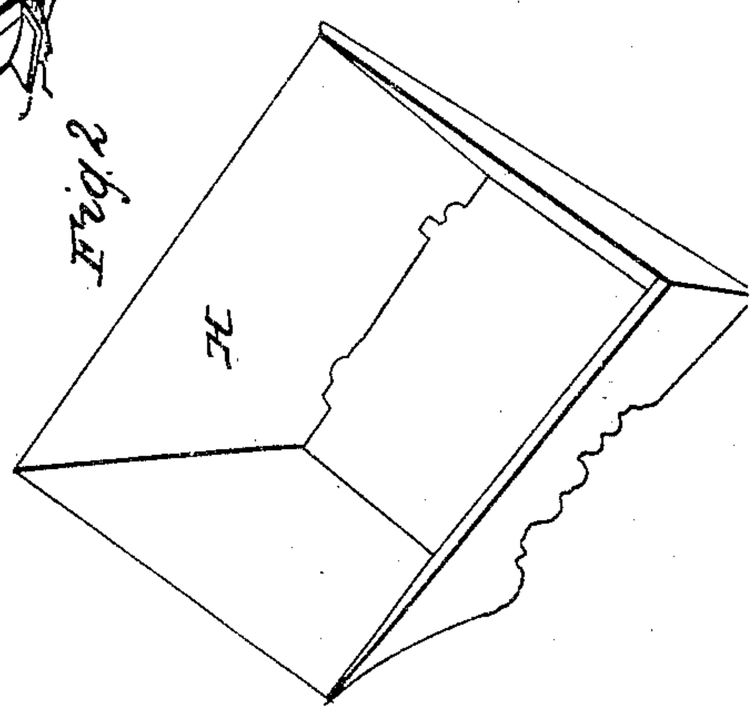


Fig. 9.



UNITED STATES PATENT OFFICE.

WILLIAM NEWLOVE, OF UTICA, NEW YORK.

IMPROVEMENT IN GRINDING-MILLS.

Specification forming part of Letters Patent No. **8,425**, dated October 14, 1851.

To all whom it may concern:

Be it known that I, WILLIAM NEWLOVE, of the city of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in the Corn Cracker and Grinder or the Machine for Shelling, Cracking, and Grinding Corn in the Ear; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the machine with the hopper removed for the purpose of showing the cracking-cylinders A A. Fig. 2 is the said hopper, marked H. Fig. 3 is a side view of the crackers A and inner grinding-cone B with a view of the cavity with its smaller end *d* and the peculiar openings therein formed by the introvenient points *e e e e*, which are seen more distinctly in Fig. 4, which is a perspective view of said inner grinding-cone B with the smaller end *d* removed to show the said cavity and the shape and form of the openings and the shape and form of the introvenient points *e e e e*. Fig. 5 is a section of the outer grinding-cone C with the opening *i*, through which the material to be ground passes into the cavity of the inner cone B, and thence between the grinding-surfaces of these two cones. Fig. 6 is a perspective view of said outer cylinder C and of the reversed position of the grinding-teeth in said cone. Fig. 7 is a side view of two of the plates forming the teeth of the cracking-cylinders A A, and Fig. 8 is a perspective view of the bearing-box and screw in which the shaft of the cylinder of the inner cone runs and by which the feed is regulated.

On looking at Fig. 1, letter C, it will be seen that cone C of Fig. 6 forms part of the outside or case of the machine and is stationary, and that cone B of Fig. 3, when in place, is inside of cone C, and that the corn is ground between the inside surface of cone C and the outside surface of cone B.

The nature of my invention consists in conducting the material to be ground directly from the crushing-rollers by means of openings through these two grinding-cones B and C into a cavity in the smaller end of the inner revolving cone B, and from thence causing the same to be distributed through the same openings between the said outer and inner grinding-cones B and C, where it is ground to the required degree of fineness. There are four openings into the cavity in the inner cone B and on opposite sides, while there is but one opening through the outer cone C. Thus, while all the corn is fed into the cavity in one direction through one opening at the same moment, all the other three openings are engaged in distributing it out again in different directions and to all parts of the grinding-surfaces equally with great rapidity.

My invention also consists in the manner of placing the teeth or cutting or grinding ridges on the inside of the outer grinding-cone C, the first section at the smaller end being large and coarse and turned so as to cut against the edges of the corresponding teeth upon the inner revolving cone, while the other sections, or those toward the larger end, are finer and turned in the opposite direction, so that their backs and not their edges are cut and crushed upon by the edges of the corresponding teeth of the inner cone B, whereby and by means of which said several improvements the material to be ground is distributed with greater rapidity and more evenly between the grinding-surfaces of said cones B and C than in any other known mode, and thus permits larger portions of the surfaces of the grinding-cones to be constantly acting upon the grain, and prevents any uneven pressure upon any part of the grinding-cones from an accumulation of material at any one point, while the teeth or ridges of the grinding-cones where the material first enters between them from their coarseness prevent clogging, and by cutting by their edges rapidly reduces the material to a state to be ground by the finer teeth at the other end of the cones, which by cutting against their backs reduces the meal to a more uniform and even condition than can ever be obtained by teeth cutting entirely against their edges. This arrangement of the teeth

is better adapted to rapidity of grinding and goodness of the work than any other arrangement known.

I will now describe the construction and use of my invention.

The material may be cast-iron or any other suitable substance. The whole machine when ready for use stands about four feet high and is about two feet square. The crushing-cylinders and the grinding-cones may be about sixteen inches long and the cylinders about six inches in diameter, and the larger ends of the cones about twelve inches in diameter and the smaller ends about seven; but all of these sizes may be varied.

The machine may be driven by horse or any other known power by means of a pulley on the main shaft.

The frame consists of two cast-iron end pieces (see Fig. 1) *a a*, with legs *b b* for the support of the machine. Extending from these end pieces and connecting them is the external grinding-cone C, Fig. 6, each end of which passes through an opening of suitable size in the said end pieces. This is seen in the drawings, Fig. 1, letter C. Directly over this cone C is on each side a plate of iron *f*, or other material, so arranged as with the upper parts of the end pieces and the top of the cone C to form a hopper-shaped receptacle over the stationary cone C for receiving the crushed corn and conveying it to the openings through the cones. The end pieces and the stationary cone C and the side pieces are held together by bolts and screws. (See Fig. 1.) Directly over this hopper-shaped form are the crushing-cylinders A A. These are formed of separate cast-iron plates of the form seen in Fig. 7, of about three-eighths of an inch thick, with a square hole in the center and a shoulder around the hole of a thickness a little greater than that of the plate. These are placed upon two square shafts and so arranged that the plates and spaces formed by the said shoulders interlock, as seen in Figs. 1 and 3. These shafts are geared together at one end, as seen at Fig. 1. On the other end (see Fig. 3) is a receiving-gear T, driven by an intermediate geared wheel J, connected with a geared pinion P on the driving-shaft of the revolving cone, as seen in Fig. 3. Over these crushing-cylinders A A is placed the hopper, (see Fig. 2, letter H,) which is of the ordinary form and is so made as to be easily placed upon the machine and remain there firmly. The corn in the ear to be crushed is thrown into the hopper H, and as the crushing-cylinders revolve inward and toward one another the ears of corn are seized by the tooth-plates, as seen at *a*, Fig. 7, and crushed into small fragments, which fall between the cylinders into the hopper-shaped receptacle below, already described, where two pins (see Fig. 3) *g g*, placed transversely on the end of the shaft *h* of the intermediate wheel J, as seen in Fig. 3, and at right angles to one another, by the revolutions of the shaft keep the crushed corn stirred up to prevent packing, and also to force it into the hole in the cone C, (to be hereinafter particularly described,) and also through the four openings in the revolving cone B, leading into the cavity, as seen in Figs. 3 and 4, (hereinafter to be particularly described,) as in revolving they pass respectively under the opening in the outer cone C. As soon as any one of the said four openings in cone B passes the opening in cone C it commences discharging the material received from out the cavity and distributing it between the cutting and grinding surfaces of the two cones, from whence the corn when cut and ground is passed out from between the larger ends of these grinding-cones, falling upon the apron *k*. (See Fig. 1, letter *k*.)

I will now more particularly describe the construction of the grinding-cones and the openings and cavity in the grinding-cone B, in which the improvements consist and in the use of which great advantages over any other machine are attained. The outer cone, Fig. 6, C is open at both ends, and its ends are reduced in size with shoulders or beveled, so as to fit snugly in the holes in the end pieces, as seen at Fig. 1, and is stationary. There is an opening quite through the upper side of this cone at the small end thereof (marked *i* in Fig. 6) of about five inches square. Directly over this opening is the hopper-shaped receptacle spoken of and the revolving pins *g g* in the end of the shaft *h* of the intermediate wheel J. (See Fig. 3.) The internal surface of the cone is composed of two sections of cast-iron plates with longitudinal teeth or ridges, one half of which, being toward the smaller end of the cone, are larger and coarser than the other half in the larger end, in about the proportion of five of the former to eight of the latter, and, while the edges of the larger teeth point to the right, those of the smaller ones point to the left, or directly opposite. The direction of the teeth or ridges are all turned toward the right to facilitate the passing freely of the grain when ground. The internal revolving cone B is formed of three parts and turns upon a shaft on the back end of which is a pulley with a pinion or toothed wheel which operates upon the intermediate wheel J, Fig. 3. The small end of the cone (see Fig. 3, letter *d*) is cylindrical and without teeth and of such size as to allow it to play freely in the opening of the outer cone at the back end, and thus serves the purpose of a head to prevent the running out of grain at that end, while it obviates the difficulties arising when a head is used on each cone—such as the falling in of grain or other substances between them—thus retarding the motion or revolution of the machine. The opposite or larger end of the cone B (see Figs. 3 and 4) is composed of finer teeth and is separate, in order to be easily replaced when worn out, as it is more liable to be than any other part from its fine teeth and greater travel. The

central part has teeth of the same character as those at the small end of cone C, with a cavity in its small end extending from the cylindrical part *d* to about its center, with four peculiarly constructed openings leading into it, each about three inches wide and three and three-fourths inches long, being the whole length of the cavity. These openings are not directly into the cavity, but curve diagonally to the right, which form is given to the opening by causing the shell of the cone to be greatly thickened upon the right side of the opening, where a flat face is presented at the opening running diagonally into the cavity one and three-fourths of an inch. From this to the next opening such thickened shell is gradually diminished with a curve to three-eighths of an inch in thickness, which will be more fully understood by reference to Fig. 4, letters *e e e e*. As before stated, the corn is forced by the pins *g* on the shaft *h* (see Fig. 3) through the opening in the cone C, (see Fig. 6, letter *i*,) and also through each of the openings in cone B, as they severally pass under the opening *i* in cone C; but from the peculiar form of these openings and the pressing in of corn through another opening no sooner does one of them pass from under the opening in C than it commences to discharge the same material from the cavity in the center between the two grinding-cones B and C, thus distributing the grain equally between them, and thereby causing it to be ground more rapidly and perfectly than in any other mode. When the grain first enters between the grinding-cones, it is reduced to a moderate degree of fineness by the teeth of the revolving cone cutting against the edges of the larger teeth of the outer cone C. Then it passes toward the front, where are the finer teeth of the same cone, which are reversed, and is ground fine by the backs of the teeth, instead of being cut by the edges, as usual, which causes it to give a greater degree of uniformity to the meal, which can never be done by the teeth cutting against each other in the usual way. The coarseness or fineness of the meal is regulated by moving out or in the revolving cone B by means of screw S, (see drawings, Fig. 8,) which acts against a movable bearing-box *a b*, in which the shaft of cone B plays, and which is supported by the bar *c d*. There is also an arrangement here to prevent the oil by which the shaft is lubricated from mingling with the corn. *e* is a perpendicular tube communicating with the exterior of the bearing, into which the oil is poured, and *f* is a cap fitted to cover this tube. When it is desired to have the corn merely shelled and freed from the cob, the side plate *f* (see Fig. 1) is removed and a drip-board placed under the crushing-cylinders, which covers up the opening in the outer cone C and carries the corn and broken cob out of the machine down onto the screen below it or under it. To this screen a rod is fastened, which is worked by a pin or gear-wheel *r*, and thus the corn is screened.

I do not claim the original invention of the crushing-cylinders, nor of a conical cast-iron mill for grinding substances; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The mode and manner of feeding the material to be ground directly from the crushing-cylinders through the opening in the outer cone C into the cavity in cone B through the four openings therein as they pass in turn under the opening in C aforesaid, and thence through the same openings out of said cavity between the two grinding-cylinders B and C, and also the mode and manner of making the said openings by the introvenient points *e e e e*.

2. The arrangement of the teeth of the outer cone C into two sets, the first section at the smaller end being large and coarse and turned so as to cut against the edges of the corresponding teeth of cone B, while the other section of teeth, or those toward the larger end, are finer and turned in the opposite direction, so that their backs and not their edges are cut and ground upon by the edges of the corresponding teeth of cone B.

WILLIAM NEWLOVE.

Witnesses:
JOHN F. SEYMOUR,
ARTHUR B. JOHNSON.